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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,219	08/26/2003	Takeshi Aizawa	4404-2	1908
23117	7590	03/25/2005	EXAMINER	
NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714			LESLIE, MICHAEL S	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/647,219

Applicant(s)

AIZAWA ET AL.

Examiner

Michael Leslie

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Applicant's arguments filed 2/1/2005 have been fully considered but they are not persuasive. Claims 1-13 are pending.

Applicant has generally argued that Gale et al does not teach a piston made of cast iron, that the reference further does not teach a cast iron from the group selected from the claimed group, and that reference further does not teach a cast iron with an elastic modulus in the claimed range, but merely teaches a conventional piston ring. This statement is not agreed with. While Gale et al only refers to a conventional piston ring, it is conventional to use a cast iron piston rings selected from one of the claimed classes of cast iron with an elastic modulus in the claimed range. Evidence of this is provided from U.S. Patent 5,972,128 to Miwa and Metals Handbook. Miwa teaches that cast iron piston rings made of flake graphite cast iron, nodular (spheroidal) graphite cast iron, and vermicular graphite cast iron are all well know and hard chromium plating layers have been widely used on these piston rings (column 1, lines 9-20). Iron is known to encompass the claimed range for the modulus of elasticity; Metals Handbook discloses that it is common at least for ductile (spheroidal) graphite cast iron to fall within the claimed range for the modulus of elasticity (page 319).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5

Art Unit: 3745

USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, "it is well-known to provide piston rings with coatings which improve the wear-resistance or compatibility of the working face against an associated cylinder wall and also the wear-resistance of the piston ring faces which co-operate with the faces of the piston ring groove in the piston." (U.S. Patent 5,743,012 to Adams et al, column 1, lines 9-13).

In response to applicant's argument that Ahlen does not recognize the "adhesion" problem, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gale et al. in view of Ogawa et al.

Gale et al. teaches a piston (10) having a ring groove (14) in which at least the ring groove is made of steel and a piston ring made of cast iron. Gale et al. does not teach a specific embodiment of the piston ring including a hard coat film formed to at least an outer peripheral

Art Unit: 3745

sliding surface of the piston ring. Ogawa et al. teaches a cast iron piston ring having a hard coat film formed to a sliding surface of the piston ring at least on an outer peripheral sliding surface of the piston ring. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Gale et al. by using a cast iron piston ring with a hard coat film formed to at least an outer peripheral sliding surface of the piston ring as taught by Ogawa et al. for the purpose of having a piston and piston ring combination for use in heavy duty internal combustion engines.

In further regard to claims 2-13, Gale et al., as modified above with respect to claim 1, further teaches that the piston and piston ring combination is for an internal combustion engine, including a diesel engine, the piston ring is made of cast iron selected from the group consisting of flake graphite cast iron, spheroidal graphite cast iron, white cast iron, malleable cast iron, vermicular graphite cast iron and alloy cast iron, the piston ring has an elastic modulus ranging from 130000 to 170000 Mpa, the hard coat film is an ion-plating film, and that the piston ring is subjected to a nitriding treatment.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahlen.

Ahlen discloses a combination of a piston and piston ring having a piston (17) with a piston ring groove (13) in which at least the piston ring groove is made of steel, a piston ring (10) made of cast iron, and a hard coat film formed to at least an outer peripheral sliding surface of the piston ring. Wherein the cast iron for the piston ring is selected from the group consisting of flake graphite cast iron, spheroidal graphite cast iron, white cast iron, malleable cast iron, vermicular graphite cast iron and alloy cast iron, and the piston ring has an elastic modulus

Art Unit: 3745

ranging from 130000 to 170000 Mpa. Ahlen does not teach that the piston moves reciprocally in a cylinder bore. The main focus of Ahlen is the sealing ring with exemplary emphasis directed to seals between relatively rotating parts for achieving a suitable seal between areas of great pressure difference. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Ahlen to move reciprocally in a cylinder bore for the purpose of dividing areas of great pressure difference.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Leslie whose telephone number is (571) 272-4819. The examiner can normally be reached on M-F 8:00am - 4:30pm.

Art Unit: 3745


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ML

March 17, 2005

  
Michael Leslie  
Patent Examiner  
AU 3745

  
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3/19/05